



COURSE OUTLINE

Course Number CHE 101	Course Title GENERAL CHEMISTRY I	Credits 4
Hours: lecture/Lab/Other 3/3/0	Co- or Pre-requisite Prerequisite: MAT-038 or MAT-044 or higher Corequisite: ENG 101 or higher	Implementation sem/year Spring 2022

Catalog description:

Basic concepts and theoretical principles of modern chemistry. Topics include stoichiometry; atomic theory and the structure of matter; periodic table; chemical bonding; kinetic-molecular theory and the states of matter; gas laws; solutions; oxidation-reduction; and acid-base systems. Lab work introduces the use of computers for data collection and analysis.

General Education Category: | Course coordinator:
Goal 3: Science

Required texts & Other materials:

"General Chemistry" 10th Ed., Whitten, Davis, Peck, and Stanley Thompson Brooks/Cole Pub., OWLv2 Homework System

Course Student Learning Outcomes (SLO):

Upon successful completion of this course, the student will be able to:

1. The student will be able to analyze, explain, solve problems with, discuss, and answer questions about Introductory Concepts (symbols, notation, mathematics, etc.) Stoichiometry, and Properties of Gases
2. The student will be able to analyze, explain, solve problems with, discuss, and answer questions about Crystal Structure, Liquids and Changes of State, Atomic Structure, and Periodic Properties
3. The student will be able to analyze, explain, solve problems with, discuss, and answer questions about Chemical Bonding, Chemical Reactions in Aqueous Solution, and Properties of Solutions
4. The student will be able to correctly, effectively, and accurately perform chemical experimentation in a safe and scientific manner, use proper scientific and laboratory safety procedures, manipulate chemicals and glassware, use laboratory balances, perform quantitative analysis such as titrations, pipetting and preparation of solutions, and treat the data that the student collects. Students will be able to use a Laboratory Information Management System (computer) to collect and treat data.
5. The student (working individually) will be able to correctly, effectively, and accurately collect and analyze data from experiments, using critical thinking and quantitative reasoning skills in observing, collecting, organizing and analyzing data, synthesizing information, interpreting

results, and communicating the results of the analyses and laboratory investigations either orally, in writing, or both.

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Chemistry (PLO)

1. Demonstrate an understanding of the fundamental principles, concepts, and terminology of chemistry;
2. Develop a working knowledge of chemical principles and methods including problem solving, analytical reasoning, and laboratory skills;
3. Utilize critical thinking, qualitative, and quantitative reasoning skills to organize, evaluate, and interpret data, expressing the results in a clearly written laboratory report or oral presentation;
4. Conduct literature searches and communicate findings orally and in writing;
5. Plan, execute, and interpret an experiment according to the Scientific Method using proper scientific and laboratory safety procedures and maintaining an accurate and complete laboratory notebook.

Units of study in detail – Student Learning Outcomes:

- I. **Introduction: SLO 1, 4, 5**
The Student will evidence a knowledge and understanding of general, basic, and elementary language, notation, and concepts central to science and chemistry and other topics generally important to an understanding of these introductory concepts through laboratory participation, brief written discussions, answering questions, and solving problems.
- II. **Stoichiometry: SLO 1, 4, 5**
The Student will evidence a knowledge and understanding of stoichiometric concepts and calculations, related concepts, and other topics generally important to an understanding of Stoichiometry through laboratory participation, brief written discussions, answering questions, and solving problems.
- III. **Gas Laws: SLO 1, 4, 5**
The Student will evidence a knowledge and understanding of the properties of gasses, the laws governing the behavior of gasses, related concepts, and other topics generally important to an understanding of Gas Laws through laboratory participation, brief written discussions, answering questions, and solving problems.
- IV. **Crystal Structure: SLO 2, 4, 5**

The Student will evidence a knowledge and understanding of properties of crystals and crystal structures, and other topics generally important to an understanding of Crystal Structure through laboratory participation, brief written discussions, answering questions, and solving problems.

V. Liquids and Changes of State: SLO 2, 4, 5

The Student will evidence a knowledge and understanding of the properties of liquids and changes of state and other topics generally important to an understanding of Liquids and Changes of State through laboratory participation, brief written discussions, answering questions, and solving problems.

VI. Atomic Structure and Periodic Properties: SLO 2, 4, 5

The Student will evidence a knowledge and understanding of atomic structure, quantum mechanics, detailed electron configuration, the relation between atomic properties and atomic structure, periodic properties, related concepts, and other topics generally important to an understanding of atomic structure and periodic properties through laboratory participation, brief written discussions, answering questions, and solving problems.

VII. Chemical Bonding: SLO 3, 4, 5

The Student will evidence a knowledge and understanding of chemical bonding and molecular structure, related concepts, and other topics generally important to an understanding of chemical bonding through brief written discussions, answering questions, and solving problems.

VIII. Chemical Reactions and Aqueous Solution: SLO 3, 4, 5

The Student will evidence a knowledge and understanding of aqueous solutions, acid-base theories and reactions, reduction-oxidation theories and reactions, balancing of redox reactions, titration and titration calculations, related concepts, and other topics generally important to an understanding of Chemical Reactions and Aqueous Solutions through laboratory participation, brief written discussions, answering questions, and solving problems.

IX. Properties of Solutions: SLO 3, 4, 5

The Student will evidence a knowledge and understanding of suspensions, colloids, and solutions, energy considerations, solubility equilibria, colligative properties, concentration units, and other topics generally important to an understanding of properties of solutions through laboratory participation, brief written discussions, answering questions, and solving problems.

Evaluation of student learning:

14 weekly quizzes, three major exams, a comprehensive and cumulative final exam which must be passed to pass the course, and 14 Laboratory Experiments and Reports. All evaluations are focused on Student Learning Outcomes, Program Learning Outcomes, and Institutional Learning Goals.